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INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension SERVICE.
CALCUTTA-27

GENERAL SCIENCE

syllabus

Classes I to V

NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

GENERAL SCIENCE

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INSTITUTE OF EDUCATION FOR WOMEN
26/9/2
Dept. of Extension
SERVICE.
18.9.68
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NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

October 1967
Kartika 1889

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Published by the Publication Unit, National Council of Educational Research and Training, B 31, Maharani Bagh, New Delhi 14 and printed at Albion Press, Kashmere Gate, Delhi 6.

GENERAL SCIENCE SYLLABUS (CLASSES I-V)

(*Revised*)

The Experimental Edition of General Science Syllabus for classes I-VIII was published by NCERT in 1963. We are glad to announce the publication of the revised edition. In its new form it deals with classes I-V only.

INTRODUCTION

This revised edition of General Science Syllabus is intended to help teachers of primary schools to teach science effectively as part of the curriculum. The Teacher's Handbook of Science for Primary Schools published by NCERT is based on this revised syllabus and the material has been rearranged on the following lines :

(1) The unit on Energy and Work has been rewritten and enlarged. This has been done because of the conviction that concepts of energy and work are too important to postpone until class IV, as was the case in the previous edition. Many of the concepts of energy and work can be understood by children in the first three class levels. Accordingly this unit has been enlarged and distributed among the first five classes.

(2) The unit on Matter and Materials has been given a treatment similar to that of the unit on Energy and Work—and for the same reasons. It too has been enlarged and distributed among classes I to V.

(3) The unit on Scientists at Work has been distributed among all the units of the syllabus. It is felt that the accounts of scientists' activities are more meaningful if they are taught in conjunction with a related conceptual theme or an appropiate unit of work.

(4) The unit on Measurements has similarly been redistributed among appropriate units. Most of the concepts formerly in that unit are now found in the units on Our Universe, Air, Water and Weather, Energy and Work and Matter and Materials.

Thus the thirteen units of the original General Science Syllabus for classes I-VIII have been reduced to eleven and rearranged in three major sections. The revised arrangement of units is as follows :

SECTION 1—THE EARTH-RELATED SCIENCES

Unit 1	*Our Universe*
Unit 2	*Air, Water and Weather*
Unit 3	*Rocks, Silos and Minerals*

SECTION 2—THE PHYSICAL SCIENCES

Unit 4	*Energy and Work*
Unit 5	*Matter and Materials*
Unit 6	*Housing and Clothing*

SECTION 3—THE BIOLOGICAL SCIENCES

Unit 7	*Living Things*
Unit 8	*Plant Life*
Unit 9	*Animal Life*
Unit 10	*Human Body, Health and Hygiene*
Unit 11	*Safety and First Aid*

This arrangement of units is more logical and better organized than the earlier one. However, this does not imply that children are to be led in their science learnings through a rigorous subject-matter organization. This highly logical subject-matter organization may appeal to the scientist and meets the needs of curriculum workers and class-room teachers. However, it does not represent the way children learn or develop interests in their environment.

A companion volume to this syllabus, Science for Primary Schools—A Teacher's Handbook has therefore been developed. It provides suggestions to teachers on the use of children's experiences with everyday materials for teaching scientific principles as well as the nature of science.

There are divergent views about the nature of science. Some believe that science is simply a collection of theories and principles, facts and formulae, special methods and scientific names. This, however, is not the whole truth about the nature of science, for science is also a set of attitudes about doing things and about thinking. These two complementary aspects of science are described in many terms, *e.g.* 'subject and method', 'content and activities', 'knowledge and behaviour', or 'product and process'.

What is meant by *product of science* ? This is the side of science familiar to most teachers and students. This is the side which basically consists of knowledge including facts and figures, formulae and equations, principles and scientific laws. This is the side of science to which most teaching effort has usually been directed.

By *process of science* is meant the things that scientists do. This includes the way they locate information in books and magazines, the way they learn through observation, the way they experiment, *i.e.* manipulate the environment for purposes of special observation. This also means the way they develop ideas of what *might* be true, the way they test these ideas and the way they communicate the ideas to others. This is the sort of thing often referred to as the *scientific method.*

Process of science also includes the patterns of thinking sometimes called *scientific attitudes*. It refers to curiosity, honest doubt, tolerance for the opinion of others and suspension of judgment. It also includes willingness to admit when one is wrong, and an inclination to make decisions on the basis of evidence rather than tradition, superstition, etc. People—scientists and others—are better off if they act in these ways.

By process of science we also mean the role of the scientific enterprise in a modern nation. This includes the part to be played by science in improving India's agriculture, health, industry, communication and transporation. It means the function of science in improving general standards of living and in helping establish personal and national security.

If science is what has been described above, how is it going to affect the children in primary schools ?

Firstly, children are affected as individuals growing up in a world which is rapidly changing through the fruits of science. A child growing up in this changing world should learn about the new features of his environment.

Secondly, attitudes can be developed well only at an early age, and scientific attitudes picked up by children at an early age should help them throughout their lives.

It is hoped that this syllabus together with the Teacher's Handbook would help teachers to provide primary school children stimulating science experiences.

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UNIT 1

Our Universe

CLASS I

Major concepts	*Sub-concepts*
1 The sun, moon, and stars are in the sky.	*a* The sun is seen during the day. *b* The stars are seen at night. *c* The moon is seen at night and sometimes during the day also.
2 The sun rises and sets every day.	*a* The sun rises every day in the same general direction (east). *b* The sun sets every day in the same general direction (west). *c* The sun rises and sets every day causing day and night.
3 The appearance of the moon changes from day to day.	*a* The moon appears round on some nights, partly round on others. *b* On some nights the moon cannot be seen.

CLASS II

1 The sun gives light and warmth to the earth.	*a* Days are bright and nights are dark. *b* Days are warm and nights are cool.

Major concepts	*Sub-concepts*
2 The sun is a very large, hot ball.	*a* The sun's surface consists of hot, glowing gases. *b* The sun is enormous ; it appears small because of its great distance from the earth.
3 When light is obstructed shadows are formed.	*a* When light is obstructed shadows are cast. *b* Objects cast their shadows.
4 Shadows change in length and direction.	*a* Shadows are longer in the morning and in the late afternoon than at midday. *b* Shadow of an object is in a direction opposite to the source of light.

CLASS III

1 The earth is a big round ball.	*a* The earth is so large that it appears flat. *b* It is possible to travel round the earth.
2 The earth rotates, causing day and night.	*a* The side of the earth facing the sun is lighted ; the other side is dark. *b* Sunlight moves from east to west along the earth's surface because the earth rotates from west to east. *c* While people in India are having day, those in America are having night, and vise versa. *d* The clock in East Pakistan is half an hour faster than in India ; the clock in West Pakistan is half an hour slower than in India.
3 The moon gets its light from the sun.	*a* The side of the moon which is toward the sun is lighted ; the rest of the moon is dark. *b* At the time of the crescent moon, the dark portion of the moon is dimly visible. *c* When the moon is full, the earth lies between the sun and the moon ; the new moon is almost on a line between the sun and the earth.

CLASS IV

Major concepts	*Sub-concepts*
1 The earth is one of the nine planets going round the sun.	*a* A planet is a body that revolves round the sun. *b* Each planet travels in its own orbit. *c* There are nine planets.
2 The earth is very hot inside.	*a* There is great pressure inside the earth. *b* Volcanoes erupt at weak portions of the earth's crust.
3 The sun is a huge hot ball.	*a* The sun's surface is extremely hot. *b* The sun's energy comes from nuclear reactions.
4 There are billions and billions of stars in the sky.	*a* Stars are invisible during daytime because of the intense light of the sun. *b* Stars are hot, glowing balls. *c* All stars emit heat and light. *d* The sun is the star nearest to the earth. *e* Some stars are in groups called constellations.
5 The earth revolves round the sun on an axis tilted with reference to the plane of the earth's revolution round the sun.	*a* The earth completes one revolution round the sun in one year. *b* The axis of the earth is tilted with reference to the plane of the earth's revolution round the sun. *c* Seasons are caused by the revolution of the earth round the sun with its axis inclined to the plane of its revolution. *d* Sunlight received by places on the earth which are near the equator does not vary much throughout the year.
6 Changes in seasons affect the lives of people, plants and animals.	*a* People use different clothes in different seasons. *b* People use different devices to keep their homes warm in winter and cool in summer. *c* The behaviour of plants and animals varies from season to season.

CLASS V

Major concepts	*Sub-concepts*
1 The moon is a barren, lifeless ball.	*a* The moon has no air or water ; no living things exist on the moon. *b* The moon's surface includes mountains, craters and flat plains.
2 Tides are caused by the gravitational attraction of the moon and the sun on the earth and its oceans.	*a* The tide-producing effect of the sun is less than that of the moon. *b* The moon's gravity produces a high tide on the side of the earth towards the moon. *c* There is a high tide produced on the side of the earth away from the moon. *d* There is a high tide about every 12½ hours.
3 An eclipse takes place when the moon and the earth are in a direct line with the sun.	*a* The shadow of the earth produces a lunar eclipse. *b* The shadow of the moon produces a solar eclipse. *c* Sometimes eclipses are total ; sometimes they are partial. *d* A lunar eclipse occurs only on a full moon night. *e* A solar eclipse occurs only one a "no moon" day. *f* Eclipses do not occur every time there is a full moon or "no moon".

UNIT 2

Air, Water and Weather

CLASS I

Major concepts	*Sub-concepts*
1 Air is everywhere.	*a* Air is something. *b* Air can be made to move. *c* Air occupies space. *d* Air offers resistance.
2 Air is necessary for many things.	*a* Air is necessary for breathing. *b* Air is necessary for fires.
3 Water is needed for life.	*a* Water is needed for drinking. *b* Water is needed for washing. *c* Water is needed for cooking. *d* Water is needed for plants. *e* Water is needed for animals.
4 Weather changes from time to time and from day to day.	It may be : *a* dry or moist, *b* hot or cold, *c* sunny or cloudy, *d* calm or windy.

CLASS II

1 Air contains water vapour.	*a* Wet clothes dry by evaporation. *b* White-wash dries by evaporation. *c* When water evaporates, it goes into the air.

Major concepts	*Sub-concepts*
	d Water vapour condenses on cool surfaces. *e* The amount of water vapour varies throughout the seasons.
2 Air contains dust and smoke.	*a* There are dust particles in the air. *b* Smoke from fires rises into the air. *c* Dust and smoke make air impure.
3 Fresh air is needed for health.	*a* Exhaled breath contains impurities. *b* When things burn impurities go into the air. *c* Doors and windows provide fresh air. *d* People go out-of-doors to get more fresh air.
4 Wind is air in motion.	*a* Wind has direction. *b* Wind has speed. *c* Wind can exert force.
5 Water is obtained from various sources.	*a* Water comes from rain, rivers, tanks and springs. *b* We dig and drill wells to get water.
6 Some water is unsafe to drink.	*a* Water may contain harmful organisms. *b* Water may contain dissolved salts. *c* Even clear water may be unfit for drinking.
7 Water is constantly undergoing change.	*a* Evaporation takes place at all times. *b* Clouds are formed from evaporated water. *c* Rain comes from clouds. *d* Some rain water sinks underground. *e* Surface water flows to rivers and the sea. *f* Underground water provides spring water or well water.

CLASS III

1 Water exists in three states which are interchangeable.	*a* Ice melts and changes to water. *b* Water freezes and changes to ice. *c* Water evaporates and changes to water vapour. *d* Water vapour condenses and changes to water.

Major concepts	*Sub-concepts*
2 **There are many types of weather.**	*a* The sun, wind, clouds and rain determine the weather. *b* It is warmer in the daytime than at night. *c* It is warmer in the sunshine than in the shade. *d* It is warmer when the sun's rays are overhead than when they are slanting. *e* Days may be windy or rainy or cloudy or all these at the same time. *f* Cloudy nights are warmer than clear nights.
3 **The weather changes.**	*a* The weather may change during the day or night, from day to day, and from time to time. *b* The weather may change due to a storm. *c* The weather may change when the direction of the wind changes.
4 **A thermometer is used to measure temperature.**	*a* When the temperature goes up, it causes liquids to expand and rise in thermometers. *b* Temperature is expressed in degrees.
5 **Weather influences travel, work, play and clothing.**	*a* (*Safety*) Travel is risky in stormy wheather and in foggy wheather. *b* (*Comfort*) During bad weather outdoor work is hard and open air games are uncomfortable. *c* (*Pleasure*) Good weather is a pleasant time for travel and for sport or picnics.

CLASS IV

1 **The sun plays an important part in causing changes in weather.**	*a* The sun warms the earth during the day. *b* The sun warms the earth more in summar than in winter because there are more hours of sunshine in summer than in winter. *c* The sun is more directly overhead in summer than in winter ; hence the sun's rays are more intense and warm the earth more.

Major concepts	*Sub-concepts*
	d During the day, the land gets warm sooner than the water and the air above the land gets warm sooner than the air above the water. *e* At night land cools faster than water. The air above land cools faster than that above water.
2 Hot air is lighter than cold air.	*a* When air is heated it expands. *b* Cold air pushes warm air up. *c* Replacement of warm air with cool air causes wind. *d* The greater the difference in temperature between cold air and warm air, the stronger is the wind.
3 Change of water into vapour is called evaporation.	*a* When water evaporates, it goes into the air. *b* The rate of evaporation is affected by several factors. (*i*) Water evaporates faster when it is windy. (*ii*) Water evaporates faster when the temperature is high. (*iii*) Water evaporates faster when the exposed surface is large. (*iv*) Water evaporates faster when the air is dry.
4 Warm air can hold more water than cold air.	*a* Sufficient cooling changes water vapour into droplets of water or into crystals of ice. *b* The conversion of water vapour into drops of water is called condensation. (*i*) When water vapour condenses on cold objects, dew is formed. (*ii*) When objects are freezing cold, frost may be formed from water vapour. (*iii*) When water vapour condenses on particles in the air it forms clouds or fog. (*iv*) When water vapour freezes in the air, it forms crystals of ice.
5 Precipitation of water occurs in different ways.	*a* Rain is formed when drops of water in the clouds grow too large to stay up in the air. *b* Sleet and hail may be formed when rain drops fall through cold air.

Major concepts	*Sub-concepts*
	c When the air is sufficiently cold, minute ice crystals collect together and fall ; this is called snow.
6 Water can be purified in many ways.	*a* Many materials are carried by water. *b* Many materials dissolve in water. *c* Sedimentation, decantation and filtration often remove suspended impurities. *d* Rain water is usually clean.
7 Water is present under ground.	*a* Water passes through porous material. *b* Water is stopped by non-porous rocks. *c* The level of water (water table) below the ground may be low or high. *d* Swamps are formed when the water table is close to the surface of the ground. *e* Water may be obtained from below the water table in wells or springs.

CLASS V

1 Air is used to inflate things.	*a* Air can be blown into a balloon or air mattress. *b* Air can be pumped into the bladder of a football or a tyre.
2 Air pressure can move liquids.	*a* Air is removed from a straw while it is used for drinking ; normal air pressure then forces the liquid up. *b* Air is removed from an ink filler or a syringe before using it ; normal air pressure then forces the liquid up. *c* Air pressure raises liquids in common lift pumps. *d* Air pressure forces liquid through a siphon.
3 Air contains many gases useful to man.	*a* The gases oxygen, nitrogen, carbon dioxide, and water vapour are present in the air. *b* Oxygen is used when fuel burns. *c* All living things use oxygen in respiration.

Major concepts	*Sub-concepts*
	d Plants and animals use oxygen and release carbon dioxide in respiration. *e* Plants use carbon dioxide and release oxygen while producing food.
4 Water is a good solvent.	*a* Water dissolves many things. *b* Dissolved substances can be separated from water by evaporation. *c* Dissolved substances can be separated from water by distillation.
5 Water may contain insoluble substances and germs.	*a* Insoluble materials can be removed by sedimentation and by filtration. *b* Disease-causing germs should be kept out of water by sanitary measures. *c* Some, but not all, germs can be removed from water by sedimentation and filtration. *d* Most germs can be killed by prolonged boiling, or by certain chemicals.
6 Water exerts pressure.	*a* Water pressure varies with depth. *b* Water exerts pressure equally in all directions. *c* Water flows from high level to low level.

UNIT 3

Rocks, Soils and Minerals

CLASS II

Major concepts	*Sub-concepts*
1 There are many kinds of rocks.	*a* Rocks occurs in many sizes and shapes. *b* Rocks occur in many colurs. *c* Rocks differ ; some are soft, some are hard, some are sharp, etc.

CLASS III

1 There are different kinds of soils.	*a* Soils differ in size of particles. *b* Soils differ in their content of organic matter. *c* Clay, loam and sand are different forms of soil.
2 Different kinds of soils are formed by disintegration and by movement.	*a* Rocks are weathered by expansion, by contraction and by freezing. *b* Weathered rock is transported by erosion.

CLASS IV

1 Soil is found in layers.	*a* The upper layer of the soil is topsoil. *b* The lower layer of the soil is subsoil.

Major concepts	*Sub-concepts*
2 Soil is washed away by rain and rivers.	*a* Soil washed away from one place by rain water or rivers is deposited at other places. *b* River-deposited soil is rich.
3 Winds cause erosion.	*a* Winds often blow the soil away. *b* Winds deposit soil at other places. *c* Topsoil is easily eroded by wind.
4 Soil is conserved in many ways ; in every case man attempts to control the action of the eroding agents.	*a* Trees and grass help conserve soil. *b* Bunds or levees help conserve soil. *c* Terracing slopes help conserve soil.

CLASS V

1 Rocks are of three types : sedimentary, igneous and metamorphic.	*a* Sedimentary rocks are formed from deposits of sediment. *b* Igneous rocks are formed from molten rock material. *c* Sedimentary rocks are changed through heat and pressure into metamorphic rocks.
2 Rocks contain minerals.	*a* Minerals are chemical compounds in the earth. *b* Most of the minerals found in rocks have a crystalline from. *c* Some minerals are very common. *d* Metal ores occur as minerals.
3 Rocks and minerals have many uses.	*a* Rocks are used in many kinds of construction. *b* Some minerals are used in agriculture. *c* Some rocks contain useful metallic ore. *d* Metals are widely used in industry.
4 Coal and petroleum are valuable underground resources.	*a* Coal and petroleum are found under ground. *b* Petroleum is formed from the remains of organisms. *c* Coal is formed from vegetable matter.

UNIT 4

Energy and Work

CLASS I

Major concepts	*Sub-concepts*
1 People often need to measure distance.	*a* Distance may be thought of as "how long", "how deep", etc. *b* Distance is described in familiar units.
2 Forces are very common ; everyone deals with forces everyday.	*a* Objects have the property of weight. *b* Common materials are often described in terms of their weight. *c* Weight can be measured with a pan balance. *d* Weight is measured in familiar units.
3 There are many sources of force.	*a* Force is produced by the muscles of man and other animals. *b* People use many kinds of tools to help themselves to exert force. *c* Force is exerted by stretched rubber bands, stretched or twisted springs, bent strips of wood, etc. *d* Moving objects exert force when they are slowed down. *e* Weight is a force.

CLASS II

1 A distance can be measured by comparing it with a standard distance.	*a* Distances can be compared with one another. *b* The metre is the accepted standard of distance.

Major concepts	*Sub-concepts*
2 People often need to measure time.	*a* Time can be thought of as "how long" "how late", "when" etc. *b* Time is described in familiar units. *c* Time is often measured with clocks and watches. *d* Time can be measured with the pulse, with a pendulum, or with other simple means.
3 There are many ways of supporting the weight of objects.	*a* Objects fall unless their weight is supported. *b* Objects can be supported by pushing upon them. *c* Objects can be supported by pulling upon them. *d* Floating objects are supported by water. *e* The weight of an object can be supported by an upward force.

CLASS III

1 Forces can be compared with one another.	*a* Forces can be compared with one another. *b* The weight of a kilogram is an accepted standard of force. *c* A force can be measured with a spring-scale.
2 Moving objects encounter the force of friction.	*a* A force is required to make an object slide along a surface. *b* Smooth surfaces provide less friction than rough ones. *c* Wheels reduce friction. *d* Lubrication reduces friction. *e* Friction is sometimes desirable.
3 People often need to exert a force through a distance.	*a* When objects are supported—just kept from falling—a force is exerted, but not through a distance. *b* When an object is lifted to a higher place, force is exerted through a distance. *c* When a load is hauled along a road, force is exerted through a distance. *d* When a force is exerted through a distance, scientists say that work has been done. *e* Energy is required to do work.

Major concepts	*Sub-concepts*
4 People use many simple machines to do work.	*a* A lever can be used to exert a large force through a distance. *b* A hill or a ramp helps one lift a heavy load to a higher place. *c* Levers and inclined planes do not do work themselves ; they help people do work ; they are examples of simple machines.
5 People often need to measure area.	*a* Area is a measure of the amount of a surface. *b* Areas can be compared with each other. *c* The square metre is the accepted unit of area. *d* The area of simple shapes is easy to calculate.
6 People often need to measure temperature.	*a* Temperature can be thought of as "how hot" or "how cold". *b* Temperatures can be compared. *c* Temperature can be measured with a thermometer. *d* The freezing point and the boiling point of water provide accepted standards for temperature measurements.

CLASS IV

1 People often need to measure volume.	*a* Volume can be thought of in terms of "how full", "how big", "how much" etc. *b* Volumes can be compared with each other. *c* The volume of simple shapes is easy to calculate. *d* The cubic metre is the accepted unit of volume.
2 The concept of density is useful in describing materials.	*a* Objects of different materials have different weights, even though their volumes are the same. *b* Equal volumes of different liquids may have different weights. *c* The density of a material is expressed in terms of the weight of some standard volume of the material. *d* Water is used as the standard of density.

Major concepts	*Sub-concepts*
3 Because liquids have weight, there is force within them.	*a* There is force beneath the surface of a liquid. *b* At any one depth the force within a liquid is exerted equally in all directions. *c* The pressure within a liquid increases with the depth of the liquid. *d* Floating objects are held up by the force within water. *e* Forces within liquids can be understood in terms of pressure. *f* The atmosphere exerts pressure.
4 Many simple machines closely resemble the inclined plane or the lever.	*a* A wedge may be thought of as two inclined planes back to back. *b* A screw may be thought of as an inclined plane wrapped round a rod. *c* A windlass may be thought of as a continuously moving lever. *d* A pair of meshed gears may be thought of as one set of levers pushing against another. *e* A single pulley simply changes the direction of a force.
5 Heat is a useful form of energy.	*a* Heat is useful to man in many ways. *b* Heat is obtained from various sources. *c* All sources of heat are also sources of energy. *d* Heat energy can be converted from energy of motion. *e* Heat can be converted into motion.
6 The concept of speed is useful to describe the motion of objects.	*a* Speed can be thought of in terms of "how fast", "how quick", etc. *b* An object moving at high speed goes a long distance in a short time. *c* The speed of an object is described in terms of how for it goes in a given period of time.

CLASS V

Major concepts	*Sub-concepts*
1 Simple machines can be understood in terms of energy.	*a* When a force is exerted through a distance, the work done is the product of the force and the distance. *b* When a simple machine is used, work is done at the "input end" of the machine. *c* When a simple machine is used, it does work at the "output end" of the machine. *d* The work output of a machine can be no greater than the work input. *e* The performance of a simple machine can be easily described in terms of its mechanical advantage. *f* Simple machines illustrate the principle of conservation of energy.
2 An object in a fluid is supported by force.	*a* Some objects float in water. *b* Objects which sink are partially supported by water. *c* An object in water is buoyed up (supported) by a force equal to the weight of the water displaced. *d* Archimedes' principle applies to all fluids.
3 The concept of mass helps explain many things.	*a* The mass of an object is related to its inertia. *b* The mass of an object can be thought of as the quantity of matter in an object. *c* All masses attract each other. *d* The weight of an object is the force of attraction between the object and the earth. *e* The weight of an object may change, but its mass remains the same.
4 A force can change the motion of an object.	*a* An object at rest remains at rest unless acted upon by an unbalanced force. *b* An object in motion remains in motion at the same speed unless acted upon by an unbalanced force.

Major concepts	*Sub-concepts*
	c An object in motion continues its motion in the same direction unless acted upon by an unbalanced force. (*i*) A continuous force is required to make an object continue motion in a curved path. (*ii*) A ball when thrown follows a curved path because the force of gravity continuously acts upon it. (*iii*) Planets and satellites follow curved paths because of the continuous force between them and their parent bodies. *d* The above statements can be summarized as the first law of motion.
5 The mass of an object determines how much change a force can produce in the object's motion.	*a* The heavier an object is, the more force is required to put it in motion or to change its motion. *b* The intertia of an object depends not on its weight, but on its mass. *c* More force is required to change the motion of an object quickly than to do it slowly. *d* The above statements can be summarized by saying "the force required to change the motion of an object depends on the mass of the object and on the rate of change of motion."
6 Forces and actions occur in pairs.	*a* Whenever a force is exerted in one direction, there is also an equal force in the opposite direction. *b* When a force separates two objects which are free to move, both objects move. *c* The above statements can be summarized by saying, "for every action there is an equal and opposite reaction."

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UNIT 5

Matter and Materials

CLASS I

Major concepts	*Sub-concepts*
1 There are different types of objects in the environment.	*a* There are many varieties of plants. *b* There are many varieties of animals. *c* There are other objects which are neither plants nor animals.
2 Objects are useful to man in many ways.	*a* Plants provide food. *b* Animals are useful in many ways. *c* Objects other than plants and animals are also useful.
3 Objects are made of materials obtained from different sources.	*a* Some materials are obtained from plants. *b* Some materials are obtained from animals. *c* Some materials are obtained from the earth or from the sea.

CLASS II

1 There is a large variety of materials ; many of them have different properties.	*a* Some materials break more easily than others. *b* Materials differ in colour and in weight. *c* Materials are said to be different when they have different properties.
2 Many common materials are solids or liquids.	*a* Liquids can be poured from one container to another. *b* Solid materials are rigid ; they cannot be poured.

Major concepts	*Sub-concepts*
3 The space (volume) occupied by one material can be compared with the space occupied by another.	*a* The space occupied by a liquid may be judged by pouring it into a container. *b* The volume of a solid object is the amount of space which it occupies.

CLASS III

1 Materials exist in three different states ; solid, liquid and gas.	*a* Liquids can be poured ; they take the shape of the containing vessel. *b* Solids have definite shape and volume. *c* Gases have neither definite shape nor definite volume. *d* Air is matter ; it occupies space and possesses weight.
2 The three states of matter are interchangeable.	*a* Ice changes into water and water into steam when sufficient heat energy is added. *b* Cooling changes steam into water and water into ice ; cooling produces loss of heat energy.
3 Heating and cooling produce important changes in materials.	*a* Change of state is a physical change. *b* Cooling sometimes reverses a physical change. *c* Many common changes are chemical changes. *d* Most chemical changes are not reversed by cooling.
4 Water can dissolve many things.	*a* Water dissolves many solids. *b* Solids differ in their solubilities. *c* Water can dissolve some liquids and gases.

CLASS IV

1 When a solid dissolves in liquid, it splits up into tiny particles which spread throughout the liquid.	*a* Solutions tend to be of uniform strength throughout. *b* Dissolving a material in a liquid often produces practically no increase in volume.

Major concepts	*Sub-concepts*
	c Most solids are more soluble in hot water than in cold water.
2 All matter is made up of small particles called molecules.	*a* Molecules are so small that they are not visible to the naked eye.
	b There is space among molecules.
	c The molecules that make up matter are always in motion.

CLASS V

1 The properties of the three states of matter can be explained by the kinetic molecular theory.	*a* The molecules of a soid are packed together tightly ; they vibrate without permanently leaving their places.
	b The molecules of a liquid are close together, but are free to slide over each other.
	c The molecules of a gas are far apart and completely free to move.
2 The properties of the three states of matter can be understood in terms of their energy.	*a* Molecules of a solid do not move from place to place because they have very little energy.
	b Molecules of a liquid are able to slide past one another because they have more energy than molecules in a solid ; however, they do not have enough energy to separate from one another.
	c Molecules of a gas have even more energy than molecules of a liquid ; they are extremely free to move about.
3 Some observations concerning temperature can be explained by the kinetic-molecular theory.	*a* Dyes diffuse more rapidly in hot water than in cold water.
	b Liquids and solids expand when they are heated.
	c Gases expand when they are heated ; their expansion is more than that of solids and liquids.

UNIT 6

Housing and Clothing

CLASS I

Major concepts	*Sub-concepts*
1 Man builds a house for his home.	*a* A house provides protection from wind, sun, rain, cold and enemies. *b* A house provides comfort and convenience. *c* A house provides a place to store belongings.

CLASS II

1 Houses are of different types.	*a* Some houses are permanent, others are temporary ; they may be stationary or movable. *b* Houses have different types of roofs. *c* Roofs are made of different materials.

CLASS III

1 A house should offer convenience and comfort.	*a* A house should provide space for eating, sleeping, studying, bathing, washing and storage. *b* There should be an open place for outdoor functions. *c* The house should give protection from heat, cold and rain.

Major concepts	*Sub-concepts*
2 **A house should offer safety and sanitation.**	*a* The doors and windows should have proper bolts and bars. *b* It should be possible to shut doors, windows and almirahs tightly. *c* There should be adequate drainage of kitchen and bathroom water.

CLASS IV

1 **Clean, tidy, well-aired and sanitary houses are hygienic.**	*a* A house should provide for free movement of air. *b* A house should have adequate sunlight. *c* A house should be free from dust and dirt. *d* Floors should be easy to dry. *e* Windows should have wire netting.
2 **A variety of material is used for building houses.**	*a* Walls are made of bricks, mud or wood. *b* Roofs are made of concrete, tiles, corrugated metal, asbestos or thatch. *c* Floors are made of bricks, cement or stones. *d* Plastering helps keep walls clean and dry.
3 **Clothes give protection and appearance to people.**	*a* Clothes protect the body from sun, rain, dust, and insect bites. *b* Neat and tidy clothes make us look attractive.
4 **Different kinds of clothes are used in different seasons and climates.**	*a* Cotton clothes are worm in summer and woollen clothes are worn in winter. *b* Certain clothing materials absorb the sweat from the body in summer.
5 **Thread and yarn are made from natural or artificial fibres.**	*a* Cotton and linen are obtained from plants. *b* Silk is obtained from the silk worm. *c* Wool is obtained from animal fur. *d* Scientists have developed many kinds of artificial fibres.
6 **Fibres are spun into thread and yarn ; these are woven into cloth.**	*a* Spinning wheels and hand looms are used for making hand made cloth. *b* Power looms and mills are used in modern industry.

Major concepts	*Sub-concepts*
7 Clothes last longer when well cared for.	*a* Proper laundering, drying, preserving and mending make clothes last longer and serve better.
	b Stains should be immediately removed by proper means.
	c Clothes should be properly washed to remove dirt and grease.
	d Clothes should be dampened before they are pressed.
	e Silk clothes should be washed with good quality soap or 'reetha' and dried in the shade.
	f Woollen clothes should be dry-cleaned.
	g Insects can destroy woollen and silken clothes.

CLASS V

1 Houses are constructed to give protection from natural forces and from enemies.	*a* The roof and outside walls should be constructed to withstand extremes of weather and keep out insects, etc.
	b Doors and windows should provide adequate light and ventilation.
	c Doors and windows should keep out insects, etc.
	d Drainage water outlets should have bar nets to prevent entrance of animals.
2 The type of building is influenced by climate and economy.	*a* The type of building is influenced by the availability of materials in the locality.
	b Availability of money affects house design.
	c Different materials require different methods of care.
	d Areas with heavy rainfall or snowfall have houses with sloping roofs.
	e Houses in very cold climates have well-insulated rooms.

UNIT 7

Living Things

CLASS III

Major concepts	*Sub-concepts*
1 **There are many kinds of living things.**	*a* Human beings are living things. *b* Animals are living things. *c* Plants are living things.
2 **Living things exhibit certain characteristic activities.**	*a* Living things grow. *b* Living things respire. *c* Living things respond to stimuli. *d* Living things reproduce themselves. *e* Living things die.
3 **Plants and animals differ in many ways.**	*a* Green plants manufacture their own food. *b* Non-green plants depend on other living or dead things for their food. *c* All animals depend on plants for their food. (*i*) Some animals eat plants. (*ii*) Some animals eat herbivorous animals. (*iii*) Some animals eat carnivorous animals. *d* Some animals eat both plants and animals. *e* Most familiar plants cannot move from place to place. *f* Man has the characteristics of an animal.

CLASS IV

Major concepts	*Sub-concepts*
1 **Plants live in different types of surroundings.**	*a* Some plants live on land ; others live in water. *b* Certain plants grow only where it is hot and humid. *c* Certain plants grow only in cold regions. *d* Certain plants grow only in arid regions. *e* Certain plants grow on marshy lands.
2 **Plants have special characteristics which adapt them to their surroundings.**	*a* Certain water-plants possess structures which make them float. *b* The stems of some water-plants are elongated and thus keep their leaves above water. *c* Plant leaves are so arranged that they catch the maximum amount of sunlight. *d* Plants which live in arid areas have small or thick leaves. *e* The roots of plants are arranged to absorb water.
3 **Animals live in different types of surroundings.**	*a* Some animals live in hot regions ; some live in cold regions. *b* Some animals live in holes in the ground. *c* The skin of animals is adapted to the temperature range and environment in which they live. *d* The skin of animals protects them from extreme dryness.
4 **Animals are equipped to secure the food they eat.**	*a* Some birds have hard beaks. *b* The mouths of different animals are adapted to their food habits. *c* The limbs of many animals are shaped according to their food-capturing habits.

UNIT 8

Plant Life

CLASS I

Major concepts	*Sub-concepts*
1 There are many different varieties of plants.	*a* Plants differ in size.
	b Plants differ in shape.
	c Most familiar plants have leaves.
	d Some plants have thorns.
	e Some plants grow into tall trees.
	f Some plants grow as creepers or twiners.
	g Some plants spread out while others grow straight up.
2 Many plants grow from seeds.	*a* Many plants bear flowers, fruits, and seeds.
	b Seeds contain small plants ; seeds also have food stored in them.
	c Seeds germinate when they get warmth and moisture.
3 Many food materials are obtained from plants.	*a* Food grains (cereals and pulses) come from some plants.
	b Some plants (mango, banana, citrus and guava) provide edible fruits.
	c Some plants provide edible vegetables.

CLASS II

1 The life-span of plants varies a great deal.	*a* Trees, shrubs and many herbs have long life spans.

Major concepts	*Sub-concepts*
	b Grains and most vegetables and garden flower plants live only one season.
2 Plants can be classified according to similarities.	*a* Plants may be called trees, shrubs or herbs according to their size. *b* Herbs may be called creepers or twiners if their stems are not erect.
3 Plants provide man with many kinds of useful materials.	*a* A few plants are totally edible. *b* The leaves of some plants are used as food. *c* The leaves of some plants are used to prepare drinks. *d* Dead parts of plants are used as manure. *e* The roots of some plants are used as food. *f* Fruits and seeds of many plants are used as food. *g* Stems and flowers of some plants are used as food. *h* Some plants have seeds from which oil is extracted. *i* Some plants are sources of medicines, perfumes, gums and rubber. *j* Flowers and leaves of some plants are used for decoration. *k* Some thorny plants are used as hedges. *l* Some trees provide wood for building and for fuel. *m* Some plants yield useful fibres.

CLASS III

1 A plant has different parts.	*a* A root is a part of a plant which is under the soil. *b* Stems, leaves, flowers and fruits are parts of a plant that are above the ground.
2 Different parts of a plant have different functions.	*a* The roots hold the plant in position firmly ; the plant gets its water and minerals from the soil through the root. *b* Water and minerals pass through the stem to the different parts of the plant.

Major concepts	*Sub-concepts*
	c The green leaves prepare sugar with water from the roots and carbon dioxide from the air.
	d The food manufactured in the leaves passes through the stem to all parts of the plant.
	e Materials from the soil and those manufactured in the leaves are used for the growth of the plant.
	f Many plants bear flowers which produce seeds and fruits.
3 Man often uses seeds to start new plants.	*a* Some seeds are broad-cast on soil to produce now plants.
	b Seeds of many plants are grown in nursery, and the tiny plants are then transplanted in the fields.
4 Plants require soil suitable for their growth.	*a* There are many different kinds of soil such as sand, clay and loam.
	b Soils differ in their capacities to hold water.
	c Soils contain minerals.
	d Plants require minerals for growth.
	e Different plants require certain minerals in different amounts.
	f The minerals found in organic matter are more readily avilable to plants than those present in clay and sand.

CLASS IV

Major concepts	*Sub-concepts*
1 Plants make their own food from simple materials.	*a* The water necessary for making sugar is absorbed through the roots.
	b The leaves take in carbon dioxide from the air.
	c Most of the cells of the leaf contain a green pigment called chlorophyll. These cells manufacture sugar using the energy from sunlight.
2 Grasses are the prime sources of food for man and animals.	*a* Some grasses produce edible grains called cereals.
	b Sugarcane is the stem of a grass-like plant.
	c Grasses are used as fodder for animals.

Major concepts	*Sub-concepts*
3 **Grasses are useful to man in many other ways.**	*a* Grasses are used for making paper.
	b Grasses are used as building material.
	c Grass prevents the soil from being carried away by wind and rain.

CLASS V

1 **Many plants reproduce by seeds.**	*a* A plant produces many seeds.
	b Some seeds are too immature to germinate.
	c Some seeds are destroyed by natural agencies.
	d Some seeds are destroyed by animals.
2 **Certain conditions are needed for germination of seeds and growth of plants.**	*a* Germination of seeds requires warmth, moisture and air.
	b Growth of young plants requires warmth, moisture, air, sunlight and minerals.
3 **Dispersal of seeds is necessary for the growth of new plants and continuance of the species.**	*a* When too many seedlings grow in one place only a few of them survive.
	b Some seeds have wings which carry them in the air.
	c Some seeds are formed in pods ; the walls of these curl while drying and eject the seeds.
	d Some fleshy fruits have seeds which are discarded—and thus dispersed—after the fruit is eaten.
	e Some seeds have hooks or thorns which stick to the body of animals and are carried for by them.
	f Some seeds float and are carried away by water currents.
4 **Different crops require different conditions for their growth.**	*a* Certain crops grow better in a well-aerated sandy soil.
	b Certain crops grow better in a wet, clayey soil.
	c Vegetable crops grow better in a soil rich in organic matter.
	d Melons grow well on the sands of river beds.
	e Tea and coffee plants grow well on moist, slopy hill sides.

Major concepts	*Sub-concepts*
	f Some vegetables require a cool climate ; they are grown in winter on plains and in summer on the hills.
5 Crops require protection.	*a* Crops need protection from many animals that cause damage. *b* Fungi, bacteria and viruses damage crops. *c* Seeds are preserved by drying and storing in containers which are waterproof and vermin-proof. *d* Storage bins (khatti) are sealed to keep out insects and vermin.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension
SERVICE.
CALCUTTA-27

UNIT 9

Animal Life

CLASS I

Major concepts	*Sub-concepts*
1 Animals of various kinds are to be seen on land and in the sea.	*a* There are many common animals in the environment. *b* There are many kinds of birds all around. *c* There are many kinds of insects. *d* Lizards and snakes are found in houses and gardens. *e* Fish and frogs live in and around water. *f* Many other animals live on land and in water.
2 Each animal has its own body features.	*a* All animals have four legs. *b* Birds have two legs, two wings, feathers and a beak. *c* Insects have six legs ; many of them have wings. *d* A frog has four legs which it uses for jumping or for swimming. *e* Fish have fins and scales. *f* Animals are of many different sizes.
3 All animals require food and shelter.	*a* Some animals eat grass and fodder. *b* Some animals eat grains. *c* Some animals eat insects. *d* Some animals eat other animals. *e* All animals require shelter from sun, cold, rain and enemies. *f* Birds make nests.

CLASS II

Major concepts	*Sub-concepts*
1 Domestic animals serve man in many ways.	*a* Some domestic animals provide milk to man. *b* Some birds supply man with eggs. *c* Wool is obtained from certain animals. *d* Certain domestic animals are useful as draught and farm animals. *e* Some animals guard our homes and fields. *f* The meat of certain animals is used as food. *g* The skins of some animals are used for leather. *h* The dung of animals is good manure. *i* Dung should not be used as fuel.
2 There are many kinds of wild animals.	*a* Many birds, reptiles and other animals may be wild. *b* Some wild animals are huge in size. *c* Some wild animals are very small in size. *d* Man domesticates only those animals that can be useful to him.
3 Some wild animals make their own homes.	*a* Many wild animals depend upon natural shelters for their homes. *b* Birds make their nests in trees or protected places. *c* Many animals dig holes in the ground to live in. *d* Some animals live in holes dug by other animals.
4 The food habits of wild animals differ.	*a* Some wild animals eat only plants. *b* Some wild animals eat animal flesh. *c* Some animals eat both animals and plants. *d* Some wild animals eat the remains of dead animals.

CLASS III

1 Different animals require different types of food for proper growth.	*a* Animals need good food and enough food if they are to perform properly. *b* Proper nourishment has to be given to hens so that they can lay more eggs.

Major concepts	*Sub-concepts*
	c The staple food of many animals and man is obatined from plants of the grass family. *d* The food of some animals is mainly flesh. *e* Food requirements of animals should contain body builders, energy givers, and health preservers.
2 Animals eat in different ways.	*a* Some animals swallow food whole. *b* Some animals tear their food and then swallow it. *c* Some animals nibble plants and then chew the cud. *d* Some animals live mainly on liquid food.
3 Domestic animals require care.	*a* Proper shelter should be provided to domestic animals. *b* Clean drinking water should be provided to domestic animals. *c* Animals should be properly groomed and cared for. *d* Sick animals should be given medical care.
4 The anatomy of birds is suited to their flying habits.	*a* Some birds fly at great heights and some fly at lower heights. *b* Some birds fly long distances and some birds fly short distances. *c* Wings and tail feathers enable birds to fly. *d* Hollow bones make the flight easier.
5 The anatomy of aquatic birds is adapted to swimming and flying.	*a* Webbed feet serve as paddles. *b* Aquatic birds have oily feathers to keep the body dry.
6 The beaks and feet of birds are adapted to their eating habits.	*a* The beaks of birds are adapted to the method of catching and eating food. *b* The feet of birds are suited to their eating habits.
7 Birds have different nesting habits.	*a* Most birds build their own nests. *b* Birds build nests in different places. *c* Birds build nests using different materials.
8 Birds care for their young.	*a* Most birds tend their young. *b* Young birds are cared for till they learn to fly.

Major concepts	*Sub-concepts*
	CLASS IV
1 **Animals reproduce their kind.**	*a* Some animals give birth to young. *b* Some animals lay eggs. *c* Insects lay eggs which pass through various stages before the mature insects are formed. (*i*) Some insects like grasshoppers pass through a series of moults. (*ii*) Insects like the butterfly pass through four stages in their life cycle.
2 **Some animals care for their young ; others do not.**	*a* Among the mammals the mother suckles the young. *b* Birds tend their young ones till they learn to fly. *c* Many animals do not care for their young.
	CLASS V
1 **Different kinds of animals are found in different kinds of surroundings.**	*a* Each type of environment has many different kinds of animals. (*i*) Some animals live on land. (*ii*) Some animals live in water. (*iii*) Some animals live on land and in water. (*iv*) Some animals live on the ground and also in the air. *b* Different animals have different food habits and different types of homes.
2 **Different kinds of animals have different types of limbs.**	*a* Man uses the front limbs (hands) for various kinds of work. *b* Monkeys and some other animals can also use the front limbs as hands. *c* Some birds can move on land, swim in water and fly in the air. *d* Reptiles may or may not possess limbs, but all of them can crawl along the ground.

Major concepts		*Sub-concepts*
	e	Insects walk on legs ; many of them also have wings to fly.
	f	Fish use fins for swimming.
3 Animals breathe in different ways.	*a*	Many animals breathe with lungs.
	b	Fish breathe through gills.
	c	Insects breathe through air tubes in their bodies.
4 Certain mechanisms help animals to procure their food.	*a*	Butterflies have long mouth-tubes.
	b	Frogs have sticky tongues.
	c	Some water birds have long legs and long beaks.
	d	The wood-pecker has a strong pointed beak.
	e	The eagle has strong sharp claws.
5 Some birds migrate long distances.	*a*	Birds avoid unfavourable weather conditions by migration.
	b	Certain birds find suitable nesting places by migration.
	c	Some fiish migrate long distances.

UNIT 10

Human Body, Health and Hygiene

CLASS I

Major concepts	*Sub-concepts*
1 Habits of keeping clean are necessary for health.	*a* Habits of cleanliness include cleaning of hands, face, eyes, mouth, nose, teeth, taking bath, trimming nails, combing hair and wearing clean clothes. *b* Habits of cleanliness include keeping the class-room and home clean. *c* Habits of cleanliness include having one's own drinking vessel. *d* Habits of cleanliness include covering the mouth while coughing or sneezing. *e* Habits of cleanliness include avoiding spitting in public places.
2 Habits of rest and sleep are necessary for health.	*a* Rest rebuilds the body. *b* Regular bed-time habits are necessary for sufficient rest. *c* The body needs about eight hours of sleep.
3 Habits of exercise and recreation are necessary for health.	*a* Exercise makes the body strong. *b* Recreation makes the mind feel fresh. *c* Play insures good sleep. *d* Play leads to good appetite.
4 Human beings have various needs.	*a* Human beings need to breathe air which is free from dust. *b* Human beings need water to drink ; it should be free from contamination.

Major concepts	*Sub-concepts*
	c Human beings need food to eat ; the food should be free from contamination. *d* Good food is essential for good health. *e* Human beings need clothes to cover and protect the body. *f* Human beings need shelter to protect them from the sun, rain, natural forces and enemies,
5 Physical growth is shown by an increase in height, girth and weight.	*a* Children grow in weight, in height and in girth. *b* Some parts of the body grow faster than others.

CLASS II

1 Exercise leads to the development of a healthy and strong body.	*a* The body has large and small muscles. *b* Bones and muscles move the body. *c* Bones and muscles work together. *d* Exercise builds muscles. *e* Bones and muscles give shape to the body.
2 Good posture is necessary for maintaining the proper health and appearance of the body.	*a* Correct posture is necessary for keeping the body parts in their proper natural relationship. *b* Parts function better when in proper relation with each other.
3 Children should eat good food for health.	*a* Foods are of different kinds. *b* Some foods build up bones and muscles. *c* Some foods give energy for work and play. *d* Children require fruits and vegetables for health.
4 Children should have proper food.	*a* Children should eat at regular intervals. *b* They should avoid undereating and overeating. *c* Spoiled food causes disease. *d* It is dangerous to eat food exposed to flies and dust. *e* Clean food should be eaten in clean places and from clean plates. Drinking water should be boiled.

Major concepts	*Sub-concepts*
	g Food must be well chewed. *h* Hands and mouth should be well washed before and after taking food.

CLASS III

1 **The nose, the wind pipe and the lungs are parts of the breathing system.**	*a* The chest expands when breathing in and contracts when breathing out. *b* Inhaled breath is fresh air ; exhaled breath contains waste. *c* Breathing is faster during violent exercise.
2 **Healthy breathing habits are essential.**	*a* The nose warms the air that is breathed in and prevents dust particles from being inhaled. *b* Tight-fitting clothes around the waist and chest should be avoided. *c* The same air should not be breathed over and over again.
3 **The human body is somewhat like a machine.**	*a* The sense organs make it possible to see, hear, smell, taste and feel. *b* Different organs in the body perform different functions, such as breathing, digesting food, circulating blood and removing wastes.
4 **Many organs are involved in a particular function of the body.**	*a* Food passes through the mouth, gullet, stomach, small intestines and large intestines ; the undigested part passes out. *b* The blood is pumped by the heart and distributed to all parts of the body by means of blood vessels. *c* The heart pumps the blood into the lungs where it loses carbon dioxide and gets oxygen. *d* The lungs, the kidneys, the skin and the large intestines remove wastes from the body.

CLASS IV

Major concepts	*Sub-concepts*
1 The food that is eaten is changed into a soluble form which can be absorbed and used for energy and growth by the body.	*a* Food is broken up into small pieces by the teeth. *b* Digestive juices moisten and dissolve part of the food.
2 Some foods are eaten raw (uncooked).	*a* Fruits and vegetables should be washed and sterilized if they are eaten raw. *b* Cut fruits if exposed become contaminated by germs from dust and flies.
3 Cooking improves food in several ways.	*a* Cooking makes some foods more tasty and pleasing. *b* Cooking makes some foods more digestible. *c* Cooking makes food safer to eat by destroying harmful germs. *d* There are many different ways of cooking.
4 Care should be taken not to waste foods in cooking.	*a* Cooking destroys certain vitamins ; overcooking should therefore be avoided. *b* Certain minerals and vitamins are dissolved in cooking water.
5 Foods need to be protected and preserved.	*a* Various agencies spoil food grains, vegetables and fruits. *b* Storing at low temperatures preserves food. *c* Storing in air-tight containers helps preserve food. *d* Salting preserves food. *e* Boiling preserves food. *f* Keeping in sugar syrup preserves food. *g* Cooked food should be protected against bacteria, yeast and mould.

TEETH

1 Good teeth are useful to man in many ways.	*a* Good teeth are necessary for chewing food thoroughly. *b* Teeth give the human face expression and make our speech clear.

Major concepts	*Sub-concepts*
2 There are different types of teeth.	*a* There are three basic kinds of teeth. *b* During a normal lifetime, each person has two sets of teeth.
3 Teeth decay if they are not kept clean.	*a* Food particles if left sticking to the teeth lead to their decay. *b* Teeth should be cleaned both before and after meals. *c* Massage of the gums helps to keep them healthy.
4 Tooth decay causes disease and pain.	*a* Bad teeth give rise to indigestion and stomach troubles. *b* Bad teeth cause a foul smell. *c* Decay of teeth leads to toothache.
MICROBES	
1 Microbes are microscopic living things.	*a* Microbes are too small to be seen with the naked eye. *b* Microbes are found everywhere in air, water and soil. *c* Microbes grow very rapidly under suitable conditions. *d* The common kinds of microbes include bacteria, protozoans, moulds, yeast and virus.
2 Some microbes are useful to man ; and some are harmful.	*a* Some bacteria are useful. *b* Some bacteria destroy food. *c* Some microbes cause diseases.

CLASS V

1 The nervous system is made up of three sub-systems.	*a* The central nervous system consists of the brain and the spinal cord. *b* The peripheral nervous system carries impulses to and from the central nervous system. *c* The autonomic nervous system has special functions.

Major concepts	*Sub-concepts*
2 Nerves perform different functions.	*a* Some nerves carry impulses from the sense organs to the brain. *b* Some nerves carry messages from the brain to the muscles and glands.
3 Sense organs should have care and protection.	*a* Reading should be done under proper light conditions. *b* The eyes should be protected from very bright light. *c* The eyes should be protected from injury by blows and sharp instruments. *d* The eyes should be protected from foreign bodies. *e* The ears should be protected from hard blows and solid objects.
4 Different bones in the body have different functions.	*a* Certain large bones are among the main bones of the body. *b* The bones give shape and protection to the body and its parts. *c* Movement is permitted by the joints of bones.
5 Muscles provide many kinds of movements.	*a* All movements of the body are the results of muscular contraction. *b* Movements of some muscles are voluntary ; of others involuntary. *c* Physical exercise and right posture are essential for normal development of muscles.
6 Communicable diseases are transferred in many ways.	*a* Some diseases are spread by water and food. *b* Some diseases are spread through the air. *c* Some diseases are caused by insect bites. *d* Some diseases are spread by direct contact.
7 Precautions help to prevent the spread of communicable diseases.	*a* Some precautions help to check the spread of germs from one person to another. *b* Some precautions are needed to check the growth and multiplication of germs. *c* Some measures like vaccination and inoculation improve the resistence of persons towards disease.

UNIT 11

Safety and First Aid

CLASS I

Major concepts	*Sub-concepts*
1 Walking and running.	
2 Cycling.	
3 Riding in a bus, rickshaw or tonga.	
4 Playing games and being with animals.	
5 Working with tools, stoves, lamps, etc.	
6 Bathing.	
7 Using electrical equipment.	

CLASS II

1 Walking and running.

2 Cycling.

3 Riding in a bus, rickshaw or tonga.

Major concepts	*Sub-concepts*
4 Playing games and being with animals.	
5 Bathing.	
6 Working with tools, stoves, lamps, etc.	
7 Using electrical equipment.	

CLASS III

1 Walking and running.	
2 Cycling.	
3 Riding in a bus, rickshaw or tonga.	
4 Playing games and being with animals.	
5 Working with tools, stoves, lamps, etc.	
6 Bathing.	
7 Using electrical equipment.	

CLASS IV

1 Safety precautions prevent accidents and injuries and are essential to individual and community welfare.	*a* Precautions are specially needed while walking through busy taffic. *b* Precautions are needed in handling fire in the kitchen. *c* Precautions are needed in handling electrical equipment.

Major concepts	*Sub-concepts*
	d Precautions should be taken when playing field games and taking part in sports. *e* Precautions are needed while swimming. *f* Precautions should be taken to keep broken glass, nails, sharp instruments, and poison where they can do no harm.
2 **Elementary first aid and emergency measures can reduce casualties.**	*a* Bleeding makes a person weaker. *b* Bleeding can be checked by suitable methods. *c* A bleeding wound requires a proper antiseptic dressing. *d* Insect stings and their poisons are usually neutralized by ammonia or lime water.

CLASS V

1 **Habits of safety are essential for the individual and the community.**	*a* Careless throwing of burning matches may start fires. *b* Fire can be put out if the temperature is reduced to below kindling point, or by shutting out the air supply, or removing the fuel. *c* Use a light when walking in the dark to avoid snakes.
2 **Learning and practising what to do in emergency situations is essential to good citizenship.**	*a* Burns should be protected from air and germs. *b* A person who is badly burnt should be given plenty of liquids to drink. *c* A fractured bone should not be moved without proper support. *d* Snake-bites sometimes require immediate first aid.